In the claims:

1. (currently amended): A system, comprising:

a probe module, having a probe responsive to a probe excitation field at a probe polarization frequency to produce a probe polarization and an optical source to produce a first optical beam directed at said probe to produce said probe polarization and a second optical beam directed to a sample to excite a sample polarization at a sample polarization frequency;

a sample holder holding the sample;

~~, a sample holder holding a sample which has a sample polarization at a sample polarization frequency, and~~ a mechanical oscillator engaged to one of said probe and said sample holder to move in response to an interaction between said probe polarization and said sample polarization, wherein said probe polarization frequency and said sample polarization frequency are different from each other by an amount within a frequency response range of said mechanical oscillator; and

a detection module to measure a response of said mechanical oscillator to produce a signal indicative of a property of the sample.

2. (previously presented): The system as in claim 1, wherein the detection module includes a detecting device that measures a displacement of said mechanical oscillator.

3. (previously presented): The system as in claim 2, wherein said detecting device includes a light source to produce a detection optical wave to illuminate at least a portion of said mechanical oscillator, a photodetector to receive scattered detection wave.

4 - 5 (Canceled)

6. (previously presented): The system as in claim 1, wherein said amount is equal to or near a fundamental resonant frequency of said mechanical oscillator.

7. (previously presented): The system as in claim 1, wherein said amount is equal to or near a harmonic frequency of said mechanical oscillator.

8. (currently amended): The system as in claim <u>1</u> ~~4~~, wherein said probe module includes <u>a laser to produce a laser beam from</u>

which said first and said second optical beam are derived ~~a radiation source and both of said probe excitation wave and said sample excitation wave are originated from a common wave generated from said radiation source~~.

9. (currently amended): The system as in claim 8, ~~wherein said radiation source includes a laser to produce one of said sample and said probe excitation waves, and~~ wherein said probe module includes an acousto-optic modulator which modulates said laser beam to produce said first and said second optical beams at different optical frequencies ~~another of said sample and said probe excitation waves~~.

10 - 12 (Canceled)

13. (previously presented): The system as in claim 10, wherein a polarization of the output is modulated.

14. (previously presented): The system as in claim 1, further comprising a feedback loop to maintain said mechanical oscillator at a resonance condition.

15. (previously presented): The system as in claim 1, wherein said probe module includes at least another probe.

16. (previously presented): The system as in claim 1, further comprising a spacing monitor mechanism to monitor a spacing between said probe and said sample.

17. (previously presented): The system as in claim 1, wherein said probe is spaced from the sample by less than one wavelength of radiation from the probe excitation field.

18. (previously presented): The system as in claim 1, wherein said mechanical oscillator has a dimension less than one wavelength of radiation from the probe excitation field.

19. (currently amended): The system as in claim 4, wherein said mechanical oscillator has a dimension greater than one wavelength of radiation from said first optical beam ~~the probe excitation radiation wave~~ and wherein the inverse of a wavevector difference of said first and said second optical beams ~~probe excitation radiation and sample excitation waves~~ is

less than the inverse of a dimension of said mechanical oscillator.

20. (previously presented): A system, comprising:

a radiation source to produce at least a probe excitation wave at a probe frequency and another excitation wave at a frequency different from said probe frequency but coherent with said probe excitation wave to produce an interference field;

a probe having an array of mechanical oscillators to receive said probe excitation wave and said interference field, each mechanical oscillator responsive to said probe excitation wave to produce a probe polarization and said array of mechanical oscillators responsive to said interference field to produce polarizations representative of said interference field;

a sample holder to hold a sample with a sample polarization in a proximity of said probe to expose the sample to fields produced by said probe polarizations so as to cause motion of said mechanical oscillators from interaction between the probe polarization and the sample polarization; and

a detector module to measure movements of said mechanical oscillators.

21. (previously presented): The system as in claim 20, further comprising a detection radiation source to produce a detection radiation wave to illuminate said mechanical oscillators, wherein said detector module collects and measures scattered detection radiation wave to determine movements of said mechanical oscillators.

22. (previously presented): The system as in claim 20, further comprising a mechanism to turn on and off said mechanical oscillators individually.

23. (previously presented): The system as in claim 22, wherein said mechanical oscillators are turned on and off individually according to a Hadamard matrix.

24. (previously presented): The system as in claim 20, wherein said sample holder is movable to shift said sample relative to said probe.

25. (previously presented): The system as in claim 20, said mechanical oscillators are modulated to write information in the sample.

26. (previously presented): The system as in claim 20, said mechanical oscillators are operated to retrieve information recorded in the sample.

27. (Canceled)

28. (previously presented): A method, comprising:

producing a probe polarization by exposing a probe formed of a polarizable material to a probe excitation field of a probe radiation wave at a probe frequency;

using a sample radiation wave at a sample frequency different from said probe frequency to interact with a sample and to produce a sample polarization, wherein the sample radiation wave and the probe radiation wave are coherent to each other;

placing said sample with said sample polarization in a field of said probe polarization to effectuate an interaction between the probe and the sample;

engaging a mechanical oscillator to at least one of said probe and said sample, wherein said mechanical oscillator moves in response to said interaction, wherein the difference between

said probe frequency and said sample frequency is equal to or near a resonance frequency of said mechanical oscillator; and

detecting motion of said mechanical oscillator to measure a property of said sample.

29. (previously presented): The method as in claim 28, further comprising exposing said sample to a sample excitation field to produce said sample polarization.

30 - 31 (Canceled)

32. (previously presented): The method as in claim 28, wherein the difference between said probe frequency and said sample frequency is equal to or near a harmonic frequency of a resonance frequency of said mechanical oscillator.

33. (previously presented): The method as in claim 32, wherein said harmonic frequency is a second harmonic of the resonance frequency.

34. (previously presented): The method as in claim 28, further comprising using another electromagnetic polarization,

different from said sample polarization and said probe polarization, to affect the motion of said mechanical oscillator.

35. (previously presented): The method as in claim 28, further comprising illuminating said mechanical oscillator with a detection radiation wave at a detection frequency and detecting a scattered detection radiation wave whose frequency is shifted from said detection frequency due to the sample and probe interaction.

36. (previously presented): The method as in claim 28, further comprising scanning said probe and said sample relative to each other to obtain an image of said sample.

37. (previously presented): The method as in claim 28, further comprising modulating a polarization or said probe frequency of said probe radiation wave.

38. (previously presented): The method as in claim 28, wherein said probe includes a tip which is less than one

wavelength of said probe radiation wave to allow evanescent coupling.

39. (previously presented) The method as in claim 28, further comprising:

detecting motion of said mechanical oscillator to measure a property of said sample at a first time;

detecting motion of said mechanical oscillator to measure the property at a second time; and

correlating measurements from said first and said second times to determine the property.

40. (previously presented): The method as in claim 28, wherein said mechanical oscillator is engaged to said probe, and further comprising:

engaging a second probe to a second mechanical oscillator to measure the property of said sample; and

correlating measurements from said probe and said second probe to determine the property.

41. (previously presented): The method as in claim 40, wherein said measurements from said probe and said second probe are performed at different times.

42. (previously presented): The method as in claim 40, wherein said measurements from said probe and said second probe are performed at the same time.

43. (previously presented): The method as in claim 28, further comprising measuring the property of said sample a plurality of times when a parameter associated with excitation of said probe or sample is adjusted to have different values.

44. (previously presented): The method as in claim 28, wherein said interaction between said sample and said probe includes a dissipative interaction.

45 - 50 (Canceled)